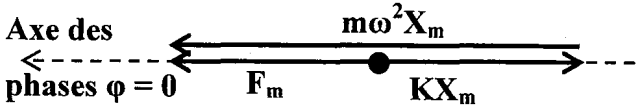
$\omega = 40\ rad.s^{-1}$

$$\omega_0 = \sqrt{\frac{k}{m}} = \sqrt{\frac{90}{0,1}} = 30\ rads - 1$$

$$\omega > \omega_0 \Rightarrow \omega^2 > \omega_0^2 = \frac{k}{m} \Rightarrow m\omega^2 > k$$



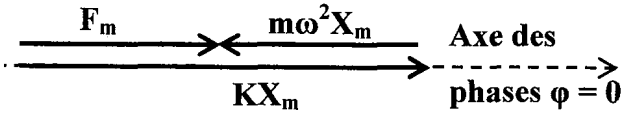
$$F_m = m\omega^2 x_m - kx_m = x_m(m\omega^2 - k)$$

$$x_m = \frac{Fm}{m\omega^2 - k} = \frac{4,5}{160 - 90} = 6,42.10^{-2}\,m$$

$x(t) = 6,42.10^{-2} \sin(40t + \pi)$ en m.

Remarque :

Si $\omega < \omega_0$



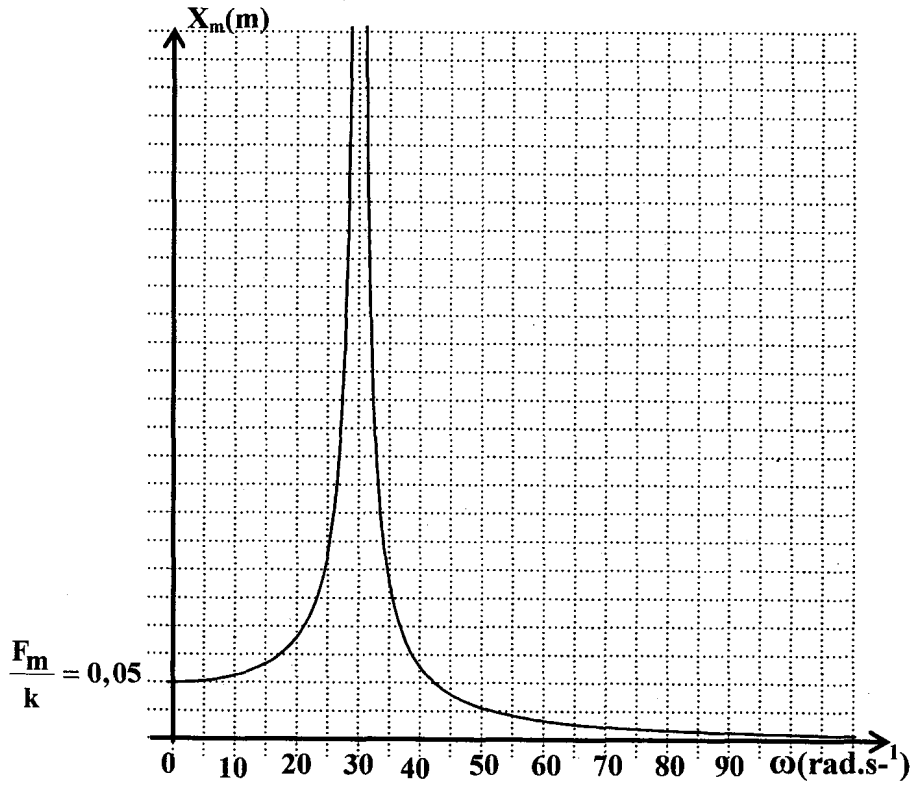
$$x_m = \frac{F_n}{k - m\omega^2}$$

$\varphi_x = \varphi_F$

Dans le cas général h = 0

$$x_m = \frac{F_m}{|m\omega^2 - k|}$$

$\varphi_x = \varphi_F$ si $\omega < \omega_0$

$\varphi_x = \varphi_F + \pi$ si $\omega > \omega_0$

b- $x_m = \frac{F_m}{|m\omega^2 - k|}$